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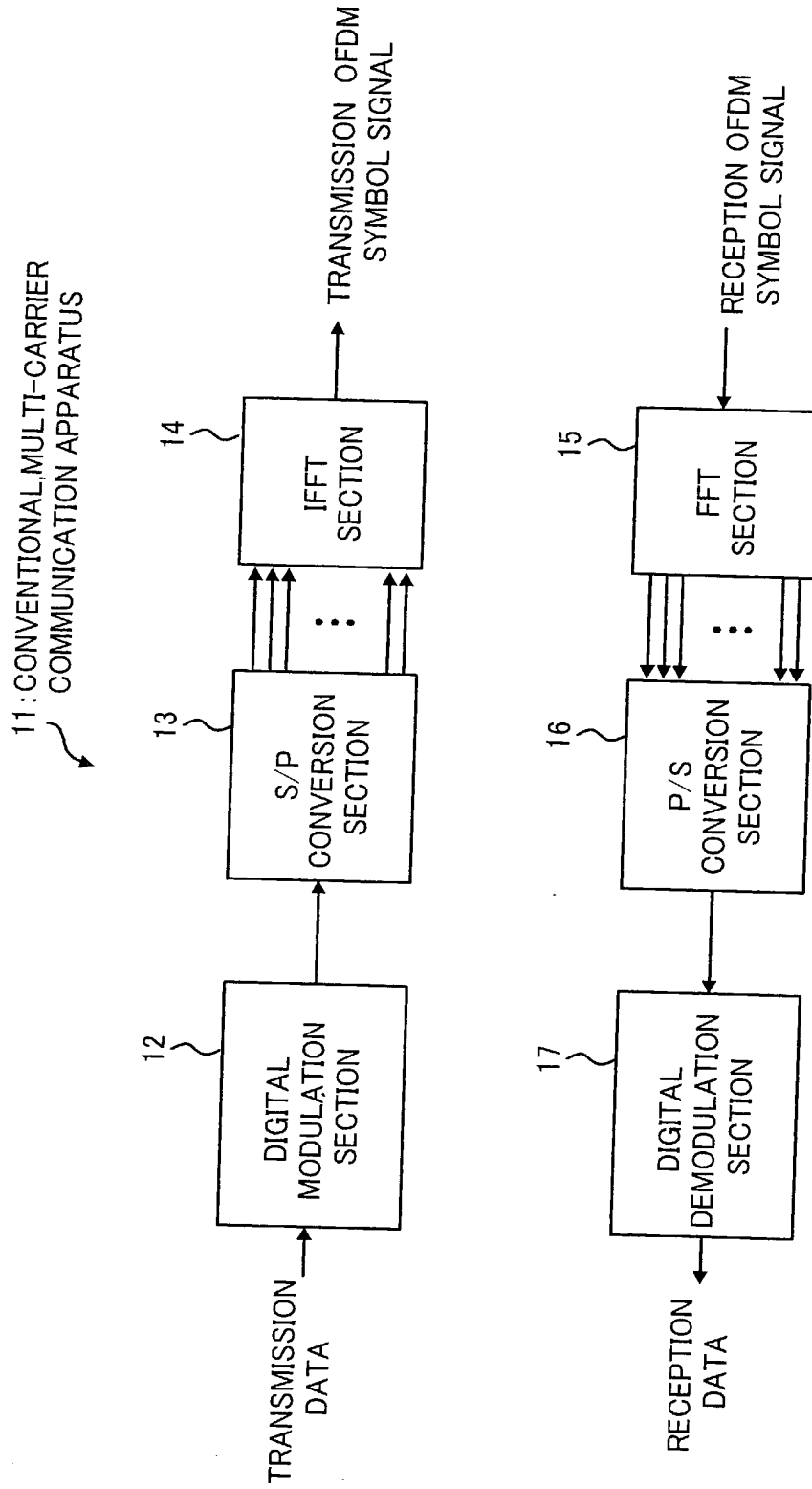


FIG.1

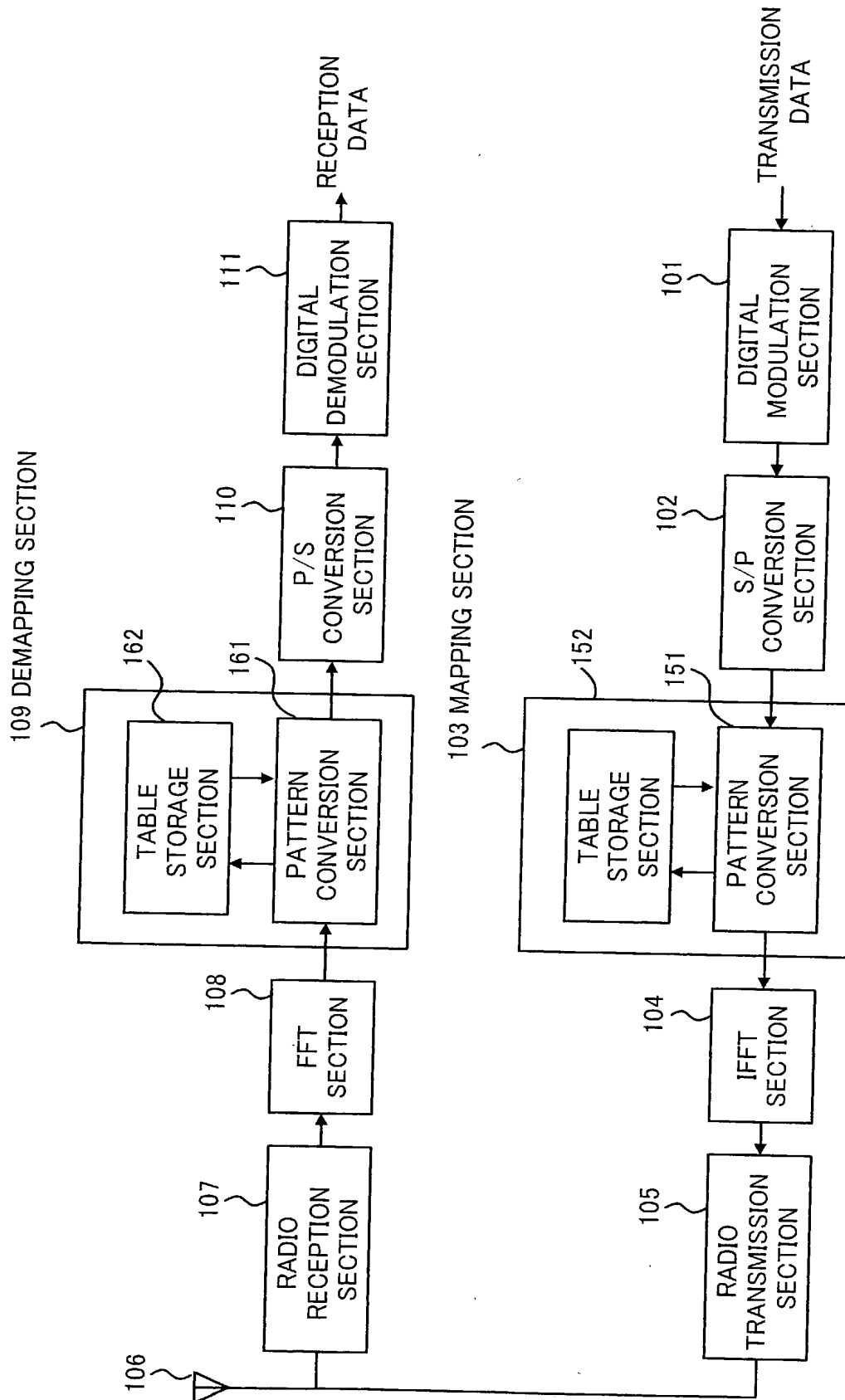


FIG.2

|    | PN1 | PN2 | PN3 | PN4 | PN5 | PN6 | PN7 | PN8 | PN9 | PN10 | PN11 | PN12 | PN13 | PN14 | PN15 | PN16 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| f1 | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | -1  | -1   | -1   | -1   | -1   | -1   | -1   | -1   |
| f2 | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  | +1  | +1   | +1   | +1   | -1   | -1   | -1   | -1   |
| f3 | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  | +1  | +1   | -1   | -1   | +1   | +1   | -1   | -1   |
| f4 | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1   | +1   | -1   | +1   | -1   | +1   | -1   |

FIG.3

|    | P1 | P2 | P3 | P4 | P5 | P6 | P7 | P8 | P9 | P10 | P11 | P12 | P13 | P14 | P15 | P16 |
|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| f1 | +1 | +1 | +1 | +1 | -1 | -1 | -1 | -1 | +1 | +1  | +1  | +1  | -1  | -1  | -1  | -1  |
| f2 | +1 | +1 | -1 | -1 | +1 | +1 | -1 | -1 | +1 | +1  | -1  | -1  | +1  | +1  | -1  | -1  |
| f3 | +1 | -1 | +1 | -1 | +1 | -1 | +1 | -1 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| f4 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | +1 | -1  | +1  | -1  | +1  | -1  | +1  | -1  |
| f1 | +1 | +1 | +1 | +1 | -1 | -1 | -1 | -1 | 0  | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| f2 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | +1 | +1  | +1  | +1  | -1  | -1  | -1  | -1  |
| f3 | +1 | +1 | -1 | -1 | +1 | +1 | -1 | -1 | +1 | +1  | -1  | -1  | +1  | +1  | -1  | -1  |
| f4 | +1 | -1 | +1 | -1 | +1 | -1 | +1 | -1 | +1 | -1  | +1  | -1  | +1  | -1  | +1  | -1  |

FIG.4

| PRE-CONVERSION OFDM<br>SYMBOL PATTERN |    |    |    |    | POST-CONVERSION OFDM<br>SYMBOL PATTERN |    |    |    |     |
|---------------------------------------|----|----|----|----|--|----|----|----|-----|
|                                       | f1 | f2 | f3 | f4 |  | f1 | f2 | f3 | f4  |
| PN1                                   | +1 | +1 | +1 | +1 |  | +1 | +1 | +1 | 0   |
| PN2                                   | +1 | +1 | +1 | -1 |  | +1 | -1 | +1 | 0   |
| PN3                                   | +1 | +1 | -1 | +1 |  | -1 | +1 | +1 | 0   |
| PN4                                   | +1 | +1 | -1 | -1 |  | -1 | -1 | +1 | 0   |
| PN5                                   | +1 | -1 | +1 | +1 |  | +1 | +1 | 0  | +1  |
|                                       |    | .  | .  | .  |  |    | .  | .  | .   |
|                                       |    | .  | .  | .  |  |    | .  | .  | .   |
|                                       |    | .  | .  | .  |  |    | .  | .  | .   |
|                                       |    | .  | .  | .  |  |    | .  | .  | .   |
| PN16                                  | -1 | -1 | -1 | -1 |  | 0  | -1 | -1 | +1  |
|                                       |    |    |    |    |  |    |    |    | P31 |

**FIG. 5**

|    | P1  | P2  | P3  | P4  | P5  | P6  | P7  | P8  | P9  | P10 | P11 | P12 | P13 | P14 | P15 | P16 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| f1 | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  |
| f2 | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  |
| f3 | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  |
| f4 | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  |
| f5 | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  |
| f1 | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  |
| f2 | +1  | +1  | +1  | +1  | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  | -1  |
| f3 | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  | +1  | +1  | +1  | +1  | -1  | -1  | -1  | -1  |
| f4 | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  | +1  | +1  | -1  | -1  |
| f5 | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  | +1  | -1  |
|    | P17 | P18 | P19 | P20 | P21 | P22 | P23 | P24 | P25 | P26 | P27 | P28 | P29 | P30 | P31 | P32 |

FIG.6

| PRE-CONVERSION OFDM<br>SYMBOL PATTERN |    |    |    |    |  | POST-CONVERSION OFDM<br>SYMBOL PATTERN |    |    |    |  |
|---------------------------------------|----|----|----|----|--|--|----|----|----|--|
| f1                                    | f2 | f3 | f4 | f5 |  | f1                                     | f2 | f3 | f4 |  |
| +1                                    | +1 | +1 | +1 | +1 |  | +1                                     | +1 | +1 | 0  |  |
| +1                                    | +1 | +1 | +1 | -1 |  | +1                                     | +1 | -1 | 0  |  |
| +1                                    | +1 | +1 | -1 | +1 |  | +1                                     | -1 | +1 | 0  |  |
| +1                                    | +1 | +1 | -1 | -1 |  | +1                                     | -1 | -1 | 0  |  |
| +1                                    | +1 | -1 | +1 | +1 |  | -1                                     | +1 | +1 | 0  |  |
|                                       |    | .  | .  | .  |  |  | .  | .  | .  |  |
|                                       |    | .  | .  | .  |  |  | .  | .  | .  |  |
|                                       |    | .  | .  | .  |  |  | .  | .  | .  |  |
| -1                                    | -1 | -1 | -1 | -1 |  | 0                                      | -1 | -1 | -1 |  |

**FIG. 7**

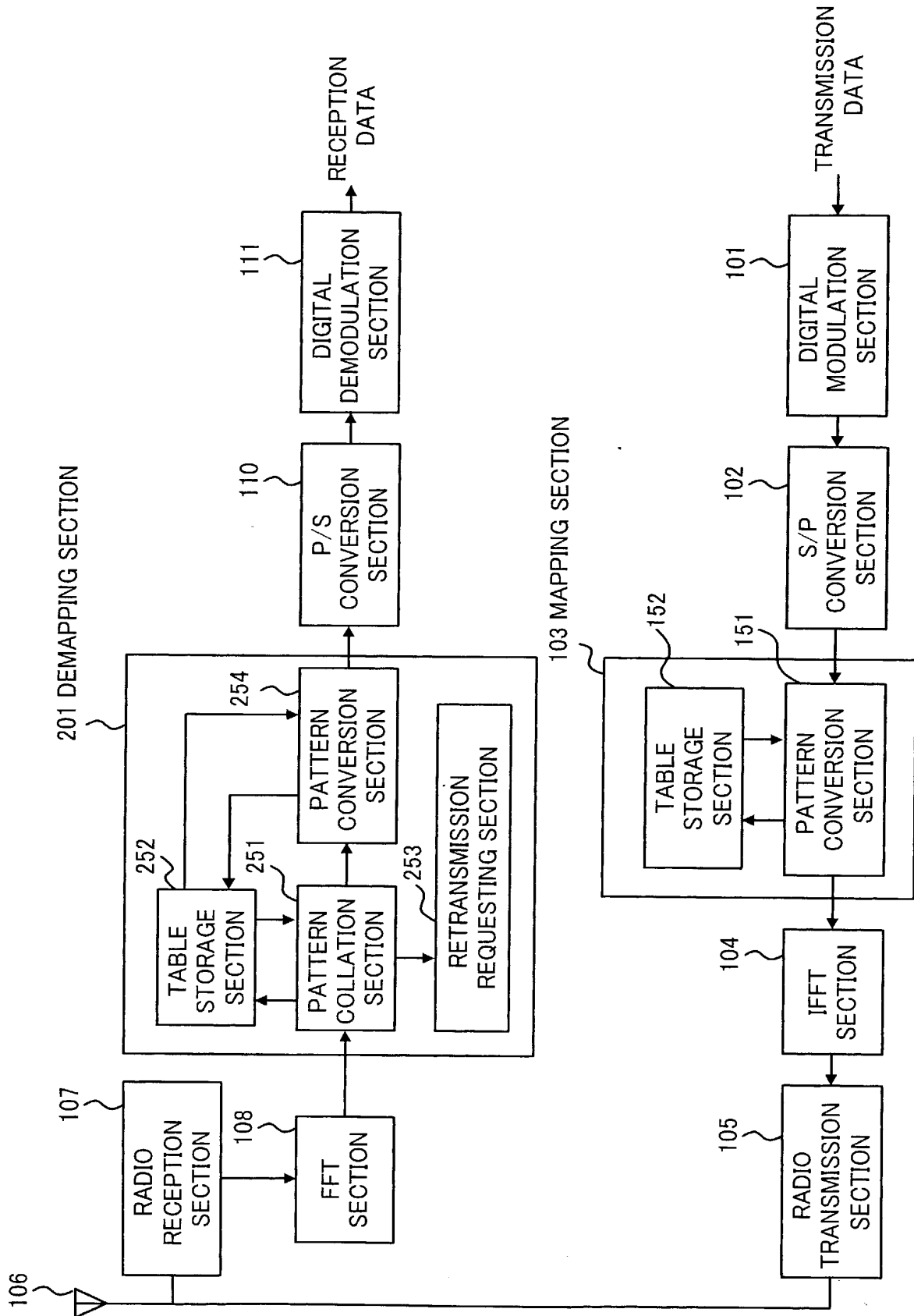


FIG.8



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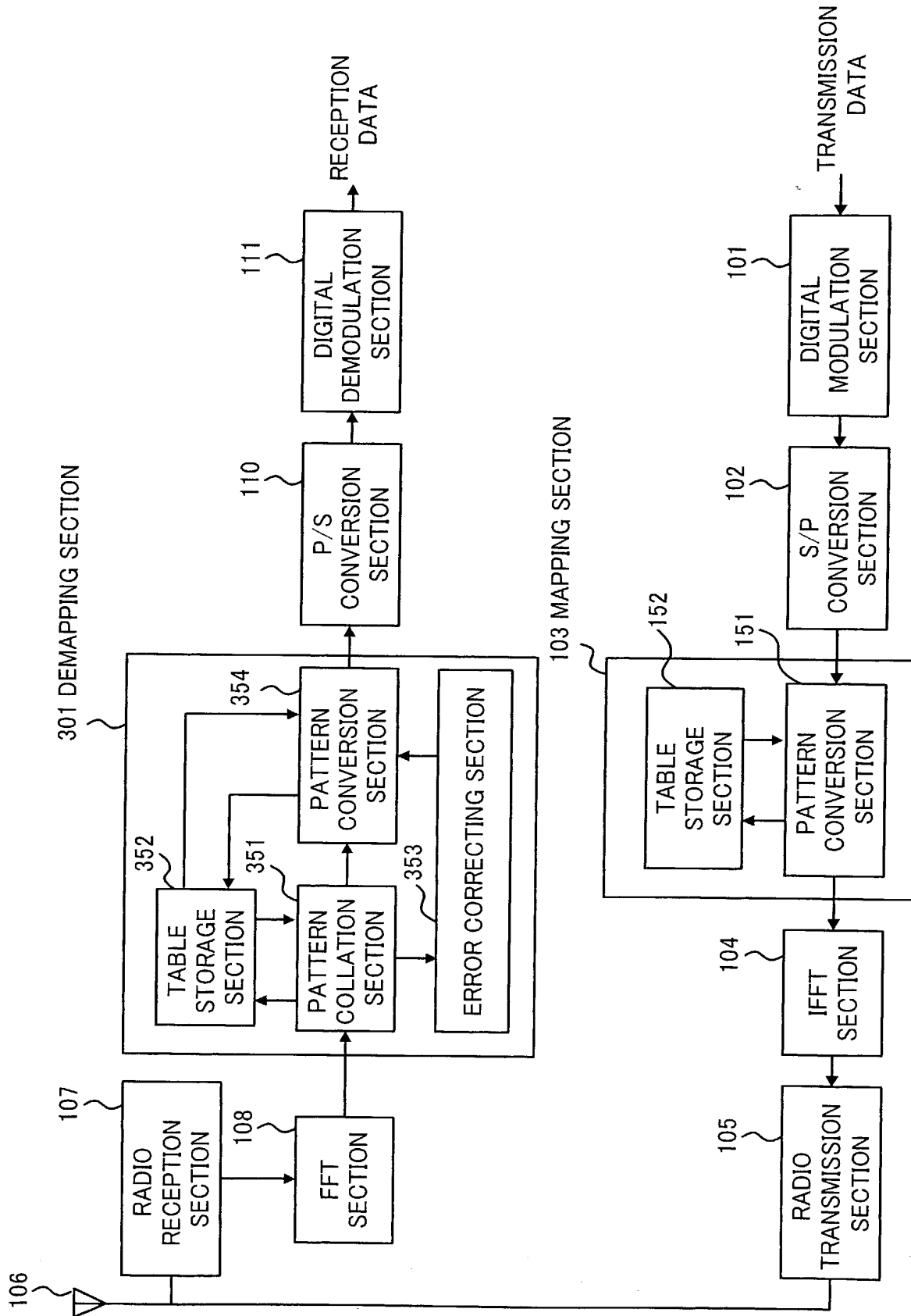


FIG.9

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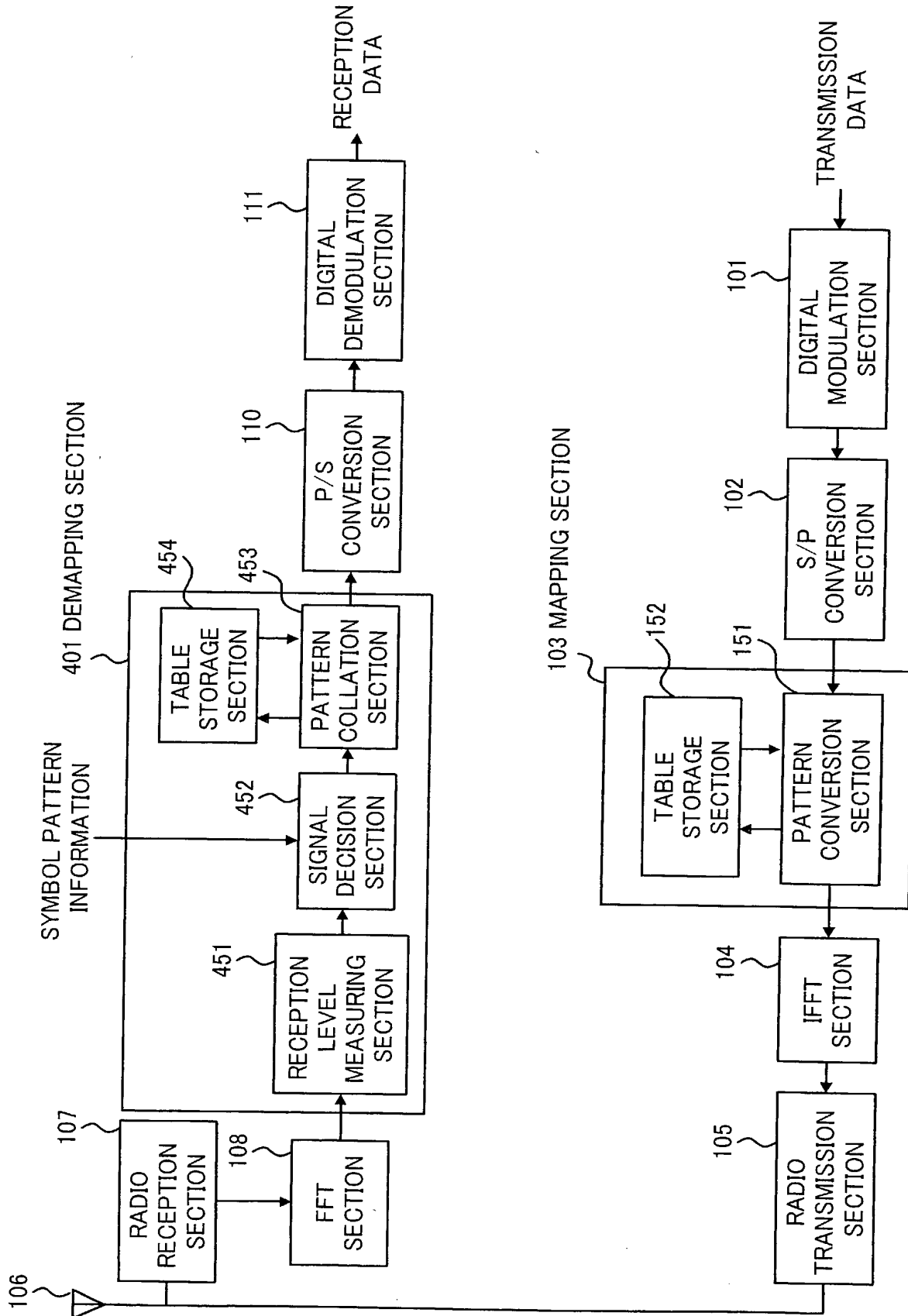


FIG.10

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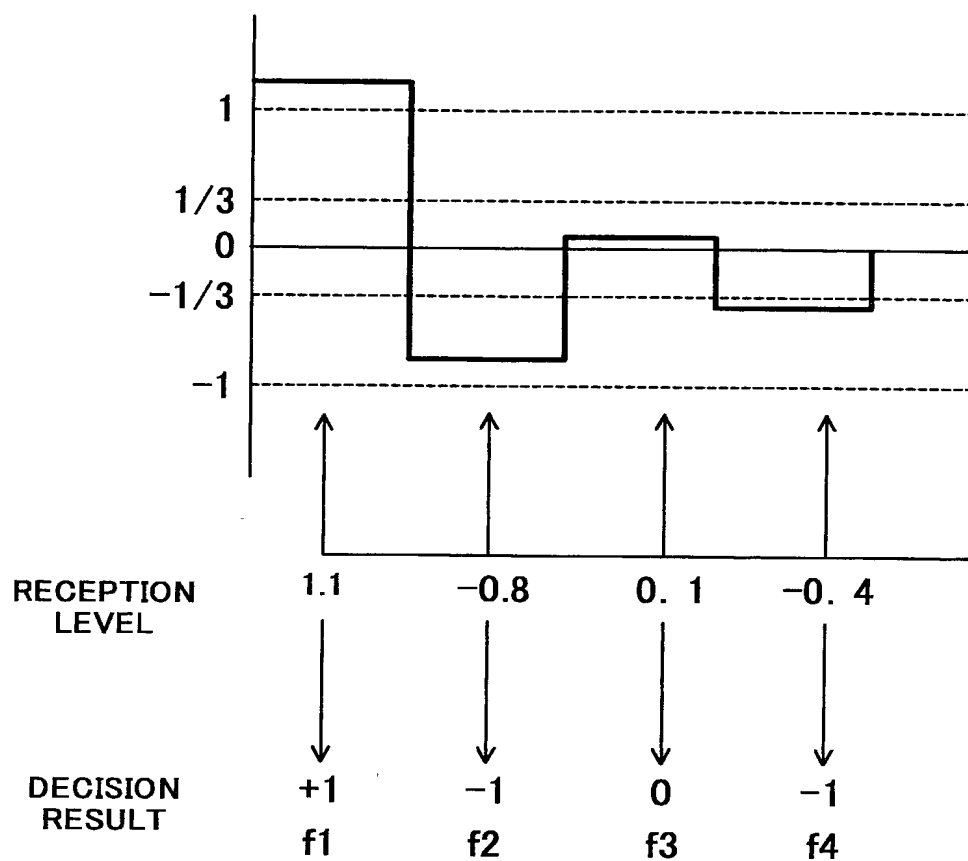


FIG.11

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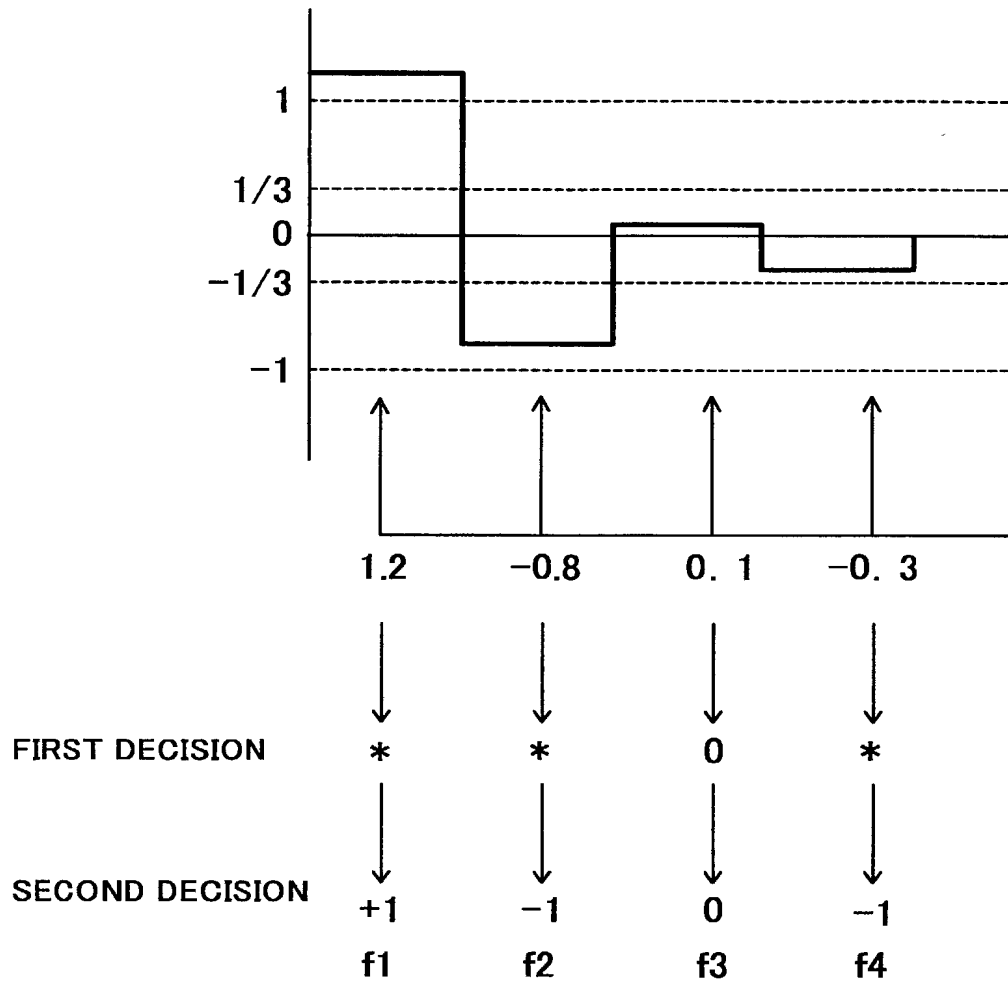


FIG.12

[illegible]

**FIG. 13**

| PRE-CONVERSION OFDM<br>SYMBOL PATTERN |    |    |    |    | POST-CONVERSION OFDM<br>SYMBOL PATTERN |     |    |    |     |
|---------------------------------------|----|----|----|----|--|-----|----|----|-----|
|                                       | f1 | f2 | f3 | f4 |  | f1  | f2 | f3 | f4  |
| PN1                                   | +1 | +1 | +1 | +1 |  | +1  | +1 | +1 | 0   |
| PN1                                   | +1 | +1 | +1 | +1 |  | +1  | +1 | 0  | +1  |
| PN2                                   | +1 | +1 | +1 | -1 |  | +1  | -1 | +1 | 0   |
| PN2                                   | +1 | +1 | +1 | -1 |  | +1  | -1 | 0  | +1  |
| PN3                                   | +1 | +1 | -1 | +1 |  | -1  | +1 | +1 | 0   |
| PN3                                   | +1 | +1 | -1 | +1 |  | -1  | +1 | 0  | +1  |
| PN4                                   | +1 | +1 | -1 | -1 |  | -1  | -1 | +1 | 0   |
| PN4                                   | +1 | +1 | -1 | -1 |  | -1  | -1 | 0  | +1  |
| ...                                   |    |    |    |    |  | ... |    |    |     |
| PN16                                  | -1 | -1 | -1 | -1 |  | 0   | -1 | -1 | -1  |
| PN16                                  | -1 | -1 | -1 | -1 |  | -1  | 0  | -1 | -1  |
|                                       |    |    |    |    |  |     |    |    | P32 |
|                                       |    |    |    |    |  |     |    |    | P24 |

FIG.14

|    | P101 | P102 | P103 | P104 | P105 | P106 | P107 | P108 | P109 | P110 | P111 | P112 | P113 | P114 | P115 | P116 |
|----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| f1 | +1   | +1   | +1   | +1   | +1   | +1   | +1   | +1   | 0    | 0    | 0    | 0    | +1   | +1   | +1   | +1   |
| f2 | +1   | +1   | +1   | +1   | 0    | 0    | 0    | 0    | +1   | +1   | +1   | +1   | -1   | -1   | -1   | -1   |
| f3 | 0    | 0    | 0    | 0    | +1   | +1   | +1   | +1   | +1   | +1   | +1   | +1   | 0    | 0    | 0    | 0    |
| f4 | +1   | +1   | -1   | -1   | +1   | +1   | -1   | -1   | 0    | 0    | 0    | 0    | +1   | +1   | -1   | -1   |
| f5 | +1   | -1   | +1   | -1   | 0    | 0    | 0    | 0    | +1   | +1   | -1   | -1   | +1   | -1   | +1   | -1   |
| f6 | 0    | 0    | 0    | 0    | +1   | -1   | +1   | -1   | +1   | -1   | +1   | -1   | 0    | 0    | 0    | 0    |

FIG.15

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| PRE-CONVERSION OFDM<br>SYMBOL PTTERN |    |    |    | POST-CONVERSION OFDM<br>SYMBOL PTTERN |    |    |    |    |    |      |
|--------------------------------------|----|----|----|---------------------------------------|----|----|----|----|----|------|
| f1                                   | f2 | f3 | f4 | f1                                    | f2 | f3 | f4 | f5 | f6 |      |
| PN1                                  | +1 | +1 | +1 | +1                                    | +1 | 0  | +1 | +1 | 0  | P101 |
| PN2                                  | +1 | +1 | -1 | +1                                    | +1 | 0  | +1 | -1 | 0  | P102 |
| PN3                                  | +1 | +1 | -1 | +1                                    | +1 | 0  | -1 | +1 | 0  | P103 |
| PN4                                  | +1 | +1 | -1 | +1                                    | +1 | 0  | -1 | -1 | 0  | P104 |
| PN5                                  | +1 | -1 | +1 | +1                                    | 0  | +1 | +1 | 0  | +1 | P105 |
| PN6                                  | +1 | -1 | +1 | +1                                    | 0  | +1 | +1 | 0  | -1 | P106 |
| PN7                                  | +1 | -1 | -1 | +1                                    | 0  | +1 | -1 | 0  | +1 | P107 |
| PN8                                  | +1 | -1 | -1 | +1                                    | 0  | 0  | -1 | 0  | -1 | P108 |
| ...                                  |    |    |    | ...                                   |    |    |    |    |    |      |
| PN15                                 | -1 | -1 | +1 | +1                                    | -1 | 0  | -1 | +1 | 0  | P115 |
| PN16                                 | -1 | -1 | -1 | +1                                    | -1 | 0  | -1 | -1 | 0  | P116 |

FIG.16



|        | PATTERN GROUP1 | PATTERN GROUP2  | PATTERN GROUP3  | PATTERN GROUP4  |
|--------|----------------|-----------------|-----------------|-----------------|
| GROUP1 | x x x x x 00   | x x x x x 0 x 0 | x x x 0 x x x 0 | 0 x x x x x x 0 |
| GROUP2 | x x x x 00 x x | x x x x 0 x 0 x | x x 0 x x x 0 x | x 0 x x x x 0 x |
| GROUP3 | x x 00 x x x x | x 0 x 0 x x x x | x 0 x x x 0 x x | x x 0 x x 0 x x |
| GROUP4 | 00 x x x x x x | 0 x 0 x x x x x | 0 x x x 0 x x x | x x x 00 x x x  |

x: +1 OR -1

FIG.17

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| PRE-CONVERSION OFDM |    |    |    |    |    |    |    |  | POST-CONVERSION OFDM |    |    |    |    |    |    |    |      |
|---------------------|----|----|----|----|----|----|----|--|----------------------|----|----|----|----|----|----|----|------|
| SYMBOL PATTERN      |    |    |    |    |    |    |    |  | SYMBOL PATTERN       |    |    |    |    |    |    |    |      |
| f1                  | f2 | f3 | f4 | f5 | f6 | f7 | f8 |  | f1                   | f2 | f3 | f4 | f5 | f6 | f7 | f8 |      |
| PN1                 | +1 | +1 | +1 | +1 | +1 | +1 | +1 |  | +1                   | +1 | +1 | +1 | +1 | 0  | 0  |    | P101 |
| PN2                 | +1 | +1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | -1 | 0  | 0  |    | P102 |
| PN3                 | +1 | +1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | -1 | 0  | 0  |    | P103 |
| PN4                 | +1 | +1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | -1 | 0  | 0  |    | P104 |
|                     |    |    |    |    |    |    |    |  |                      |    |    |    |    |    |    |    |      |
| PN65                | +1 | -1 | +1 | +1 | +1 | +1 | +1 |  | +1                   | +1 | +1 | +1 | 0  | 0  | +1 | +1 | P165 |
| PN66                | +1 | -1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | 0  | 0  | +1 | -1 | P166 |
| PN67                | +1 | -1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | 0  | 0  | -1 | +1 | P167 |
| PN68                | +1 | -1 | +1 | +1 | +1 | +1 | -1 |  | +1                   | +1 | +1 | +1 | 0  | 0  | -1 | -1 | P168 |
|                     |    |    |    |    |    |    |    |  |                      |    |    |    |    |    |    |    |      |
| PN255               | -1 | -1 | -1 | -1 | -1 | -1 | -1 |  | 0                    | 0  | -1 | -1 | -1 | -1 | -1 | +1 | P355 |
| PN256               | -1 | -1 | -1 | -1 | -1 | -1 | -1 |  | 0                    | 0  | -1 | -1 | -1 | -1 | -1 | -1 | P356 |

FIG.18

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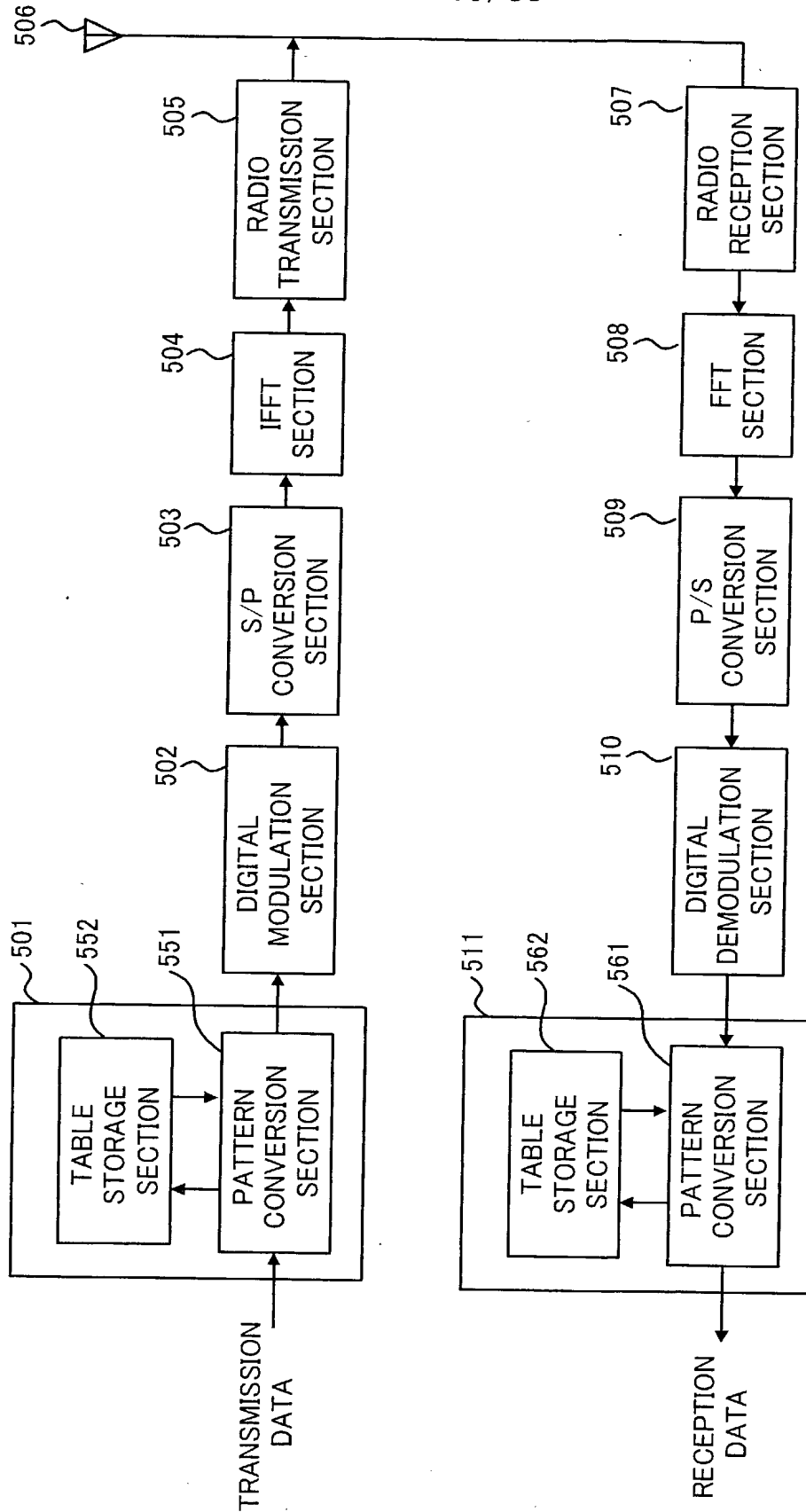


FIG.19

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| PRE-CONVERSION<br>DATA | POST-CONVERSION<br>3-VALUE DATA |
|------------------------|---------------------------------|
| 0 0 0 0                | +1 +1 +1 0                      |
| 0 0 0 1                | +1 -1 +1 0                      |
| 0 0 1 0                | -1 +1 +1 0                      |
| 0 0 1 1                | -1 -1 +1 0                      |
| 0 1 0 0                | +1 +1 0 +1                      |
| 0 1 0 1                | +1 -1 0 +1                      |
| 0 1 1 0                | -1 +1 0 +1                      |
| 0 1 1 1                | -1 -1 0 +1                      |
| 1 0 0 0                | +1 0 +1 +1                      |
| 1 0 0 1                | +1 0 -1 +1                      |
| 1 0 1 0                | -1 0 +1 +1                      |
| 1 0 1 1                | -1 0 -1 +1                      |
| 1 1 0 0                | 0 +1 +1 +1                      |
| 1 1 0 1                | 0 +1 -1 +1                      |
| 1 1 1 0                | 0 -1 +1 +1                      |
| 1 1 1 1                | 0 -1 -1 +1                      |

FIG.20

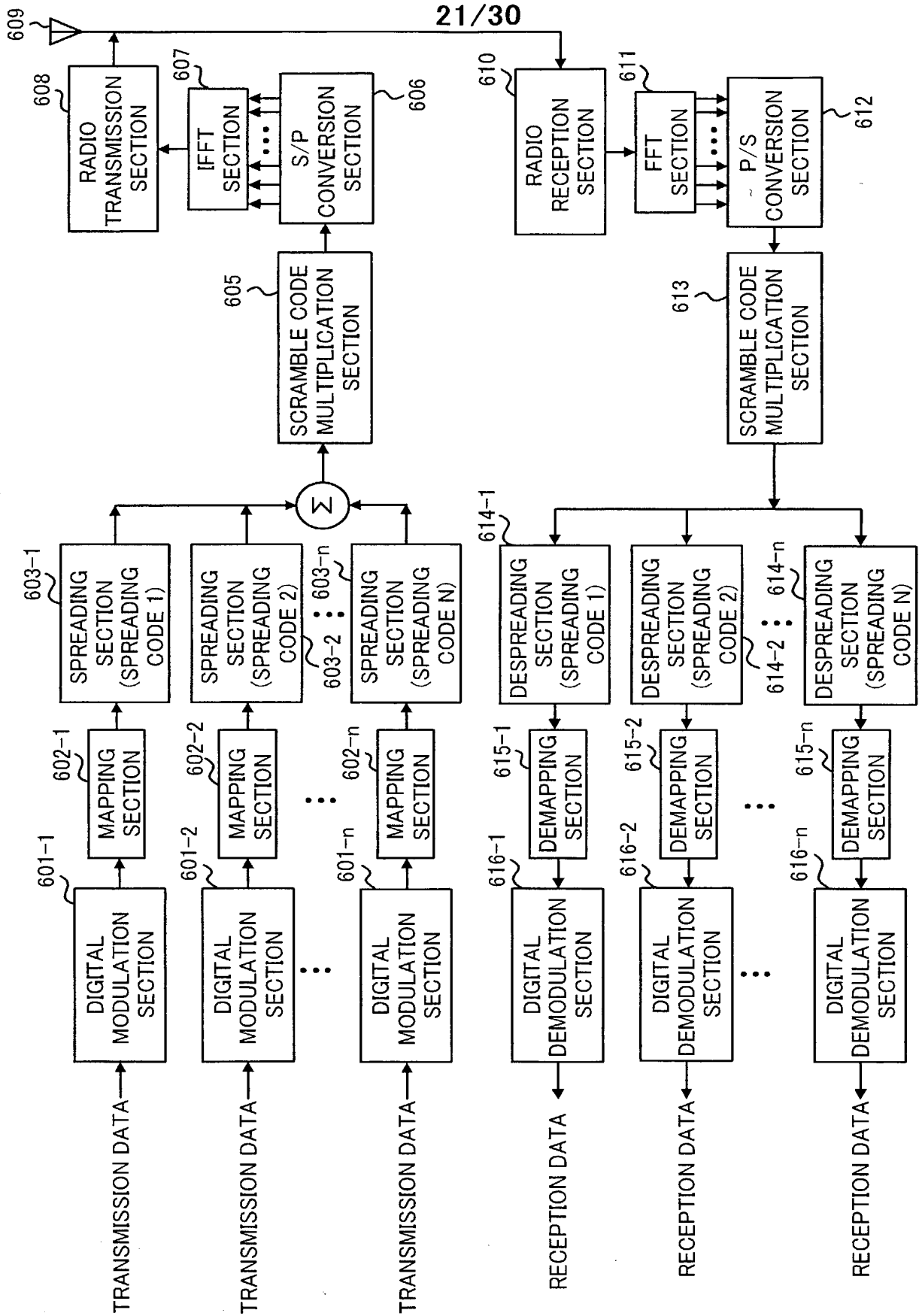


FIG.21

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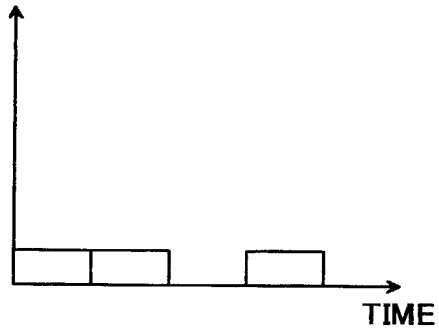


FIG. 22A

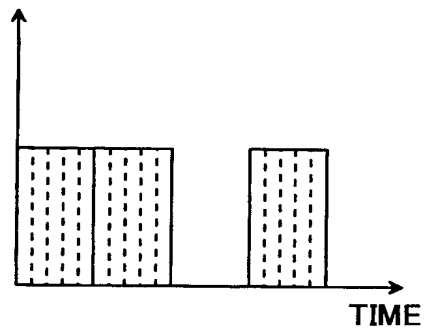


FIG. 22B

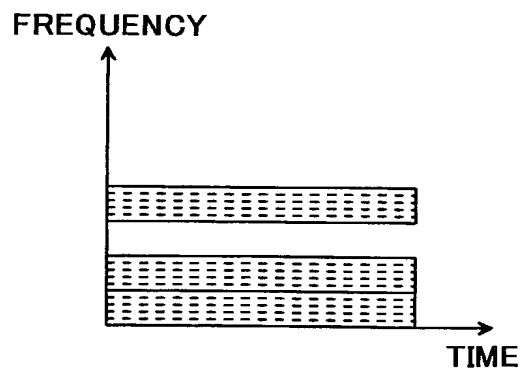


FIG. 22C

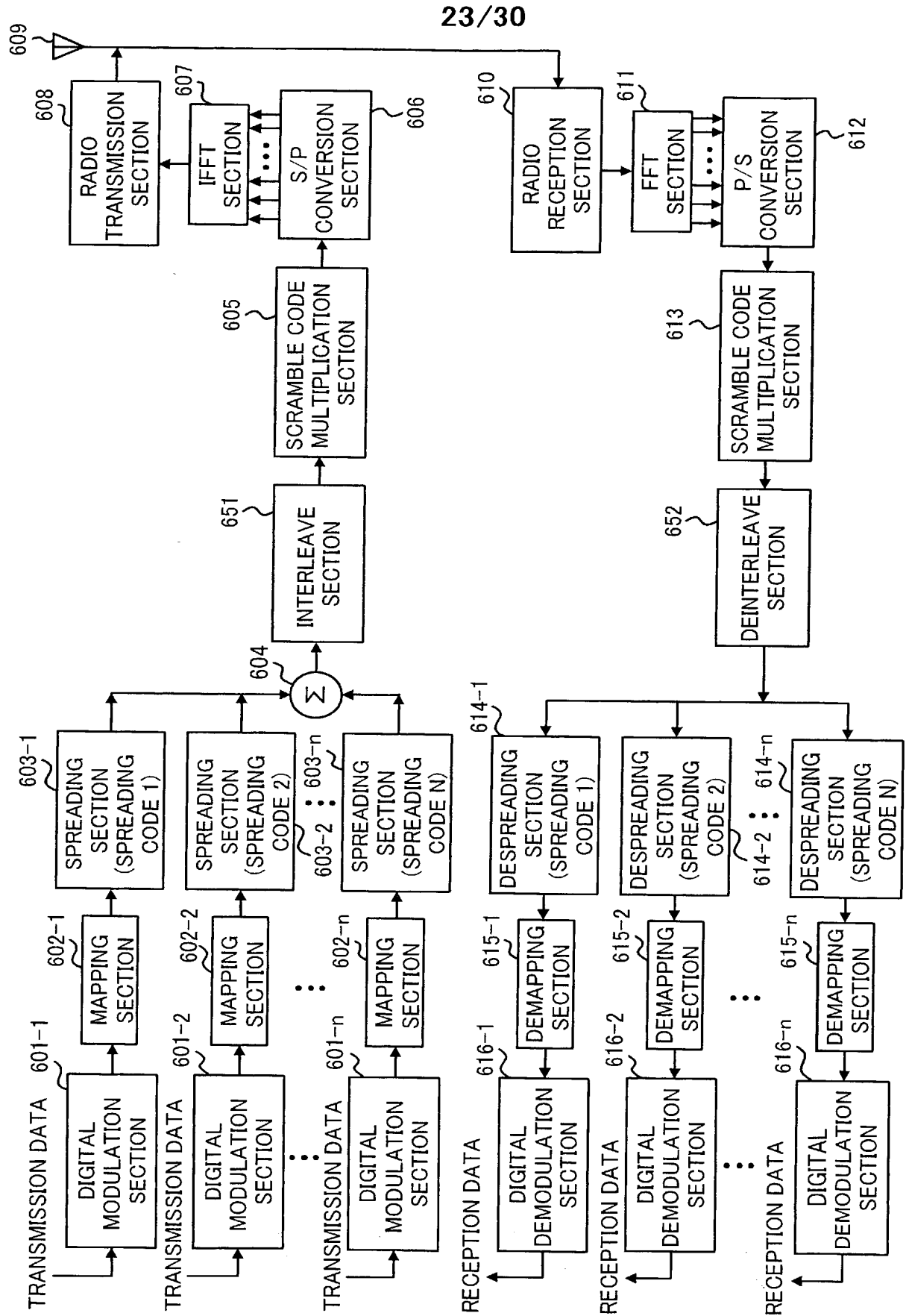


FIG.23

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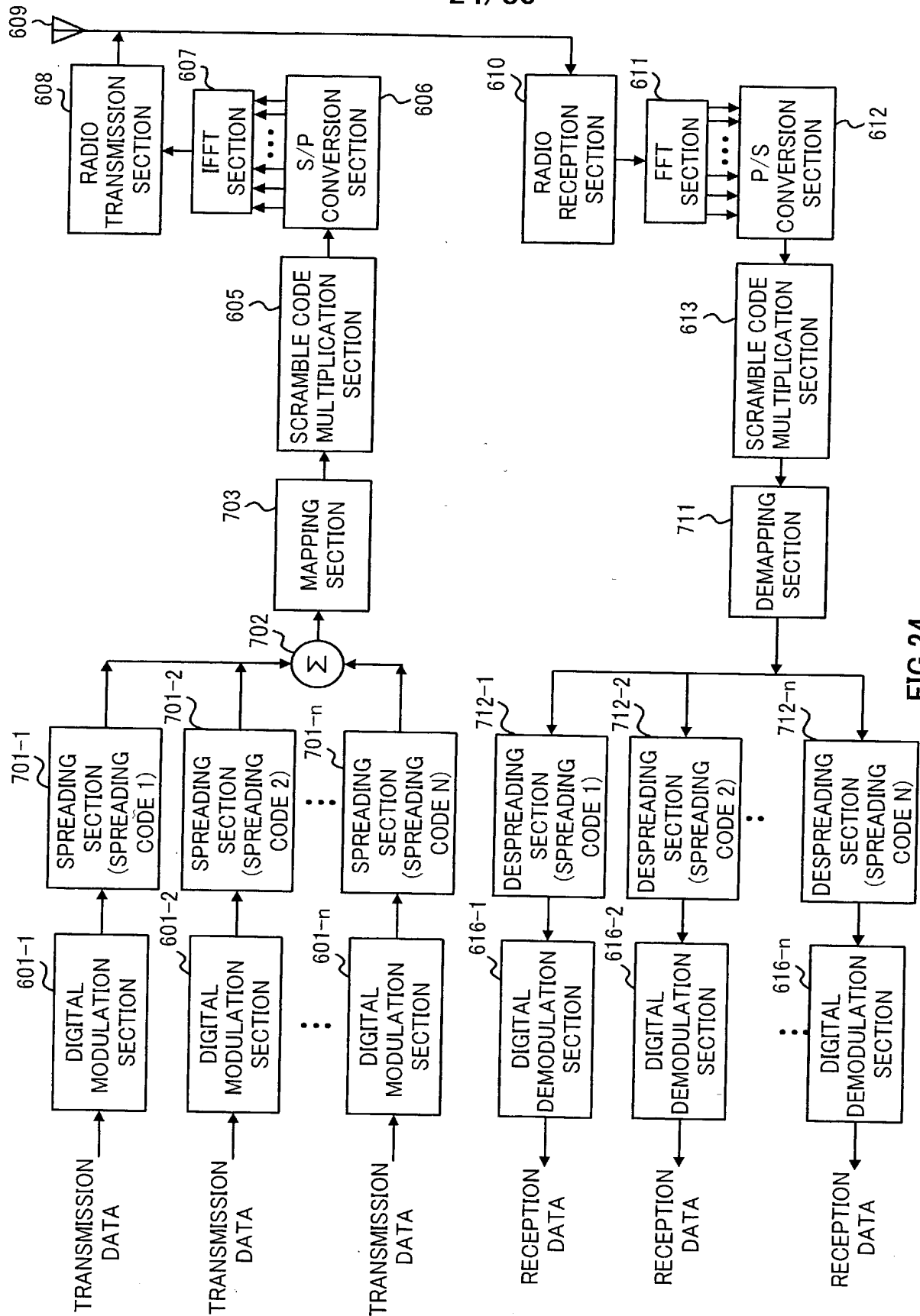


FIG.24



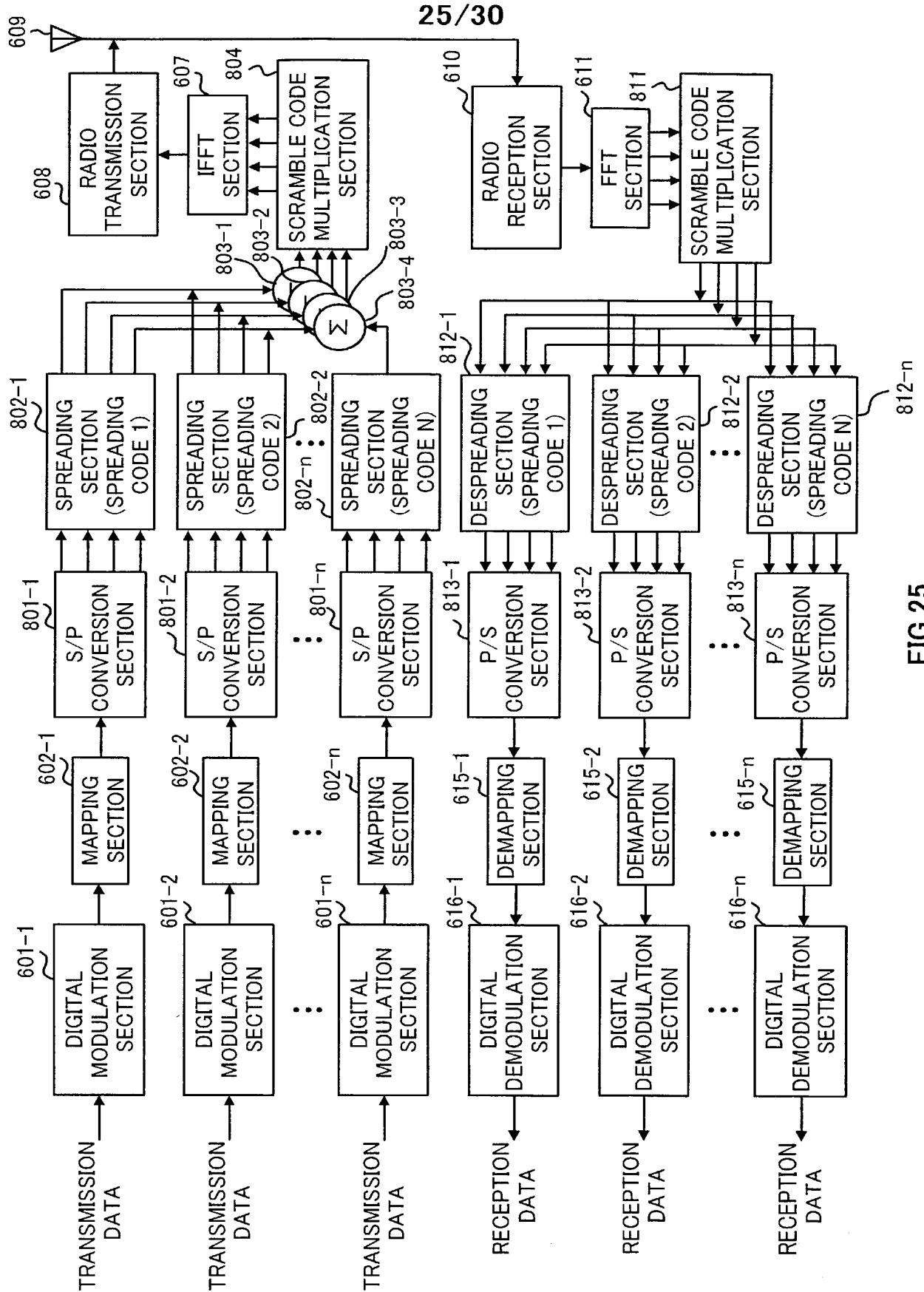


FIG.25

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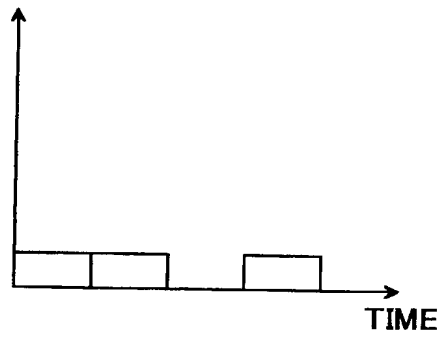


FIG. 26A

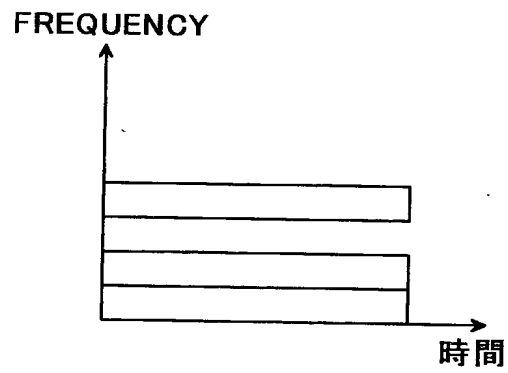


FIG. 26B

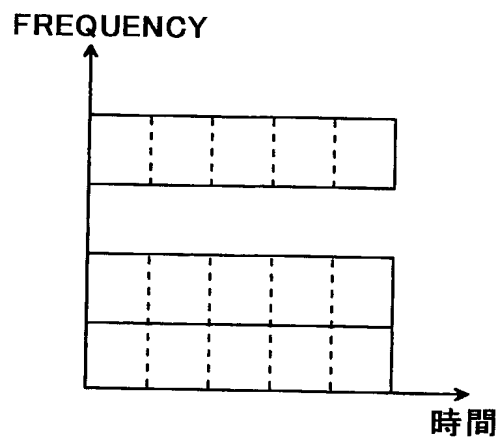


FIG. 26C

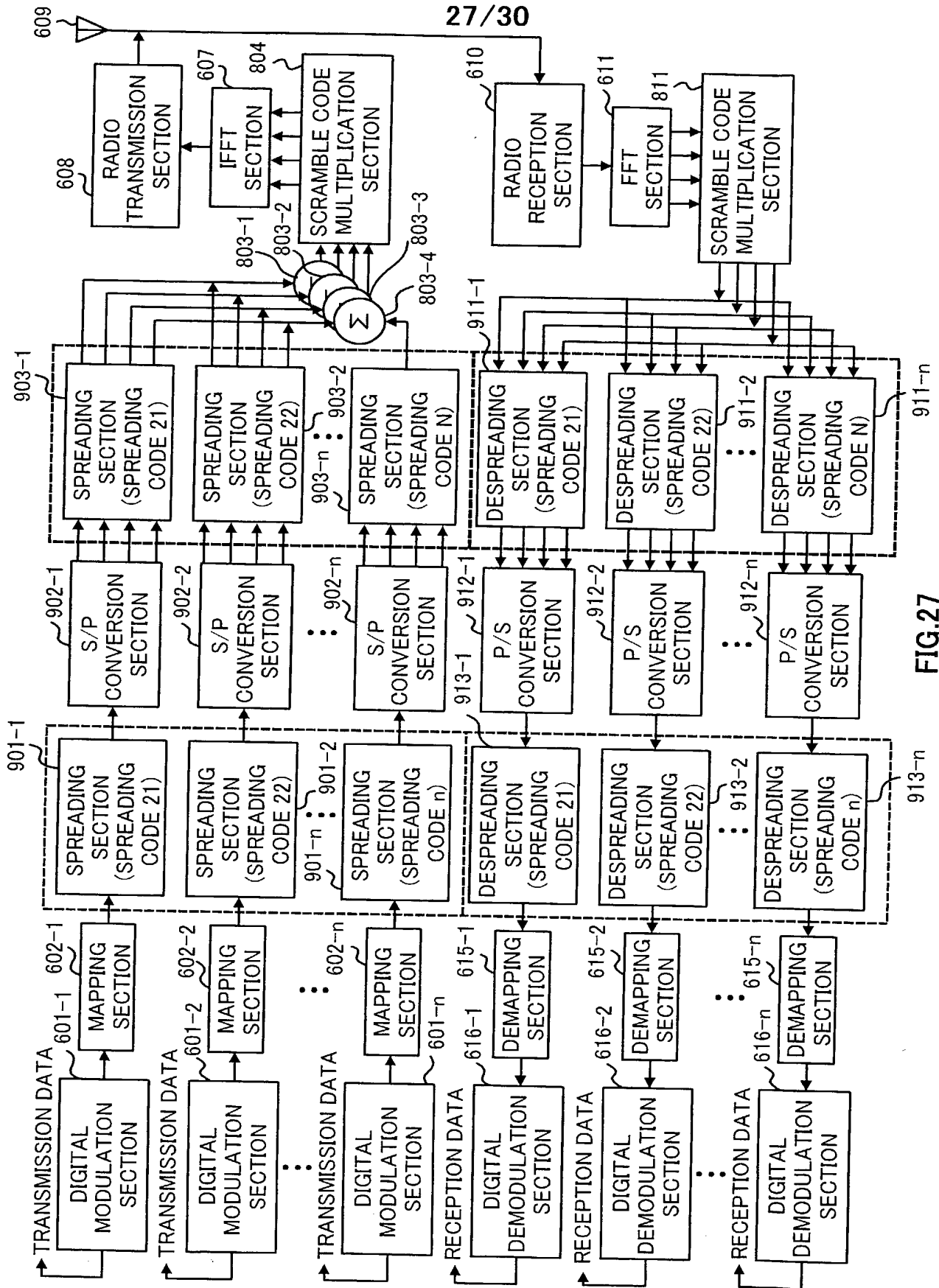


FIG. 27

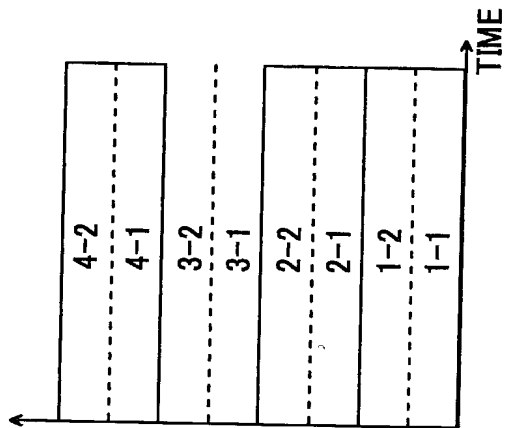
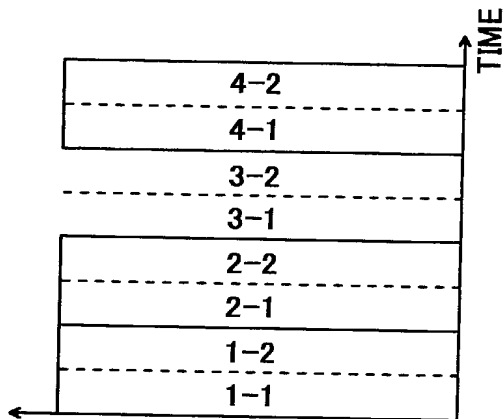
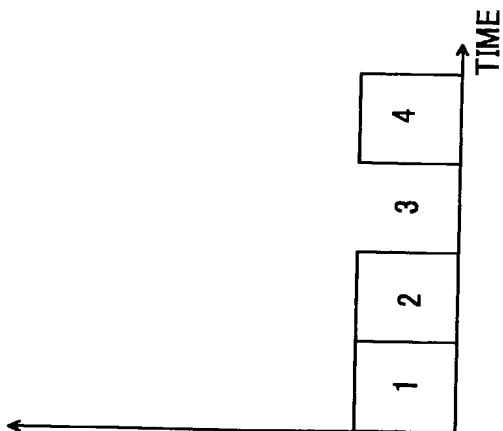


FIG. 28A

FIG. 28B

FIG. 28C

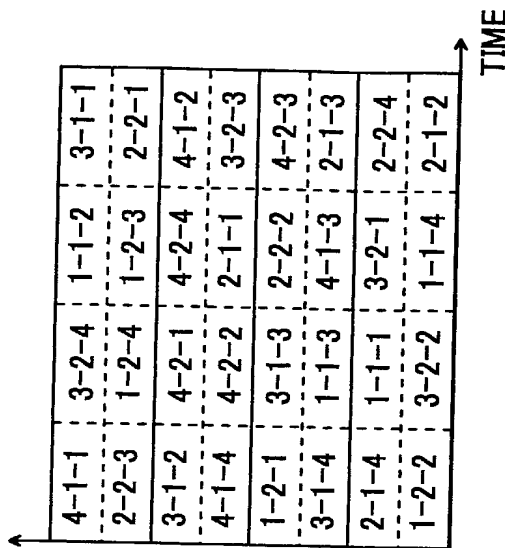
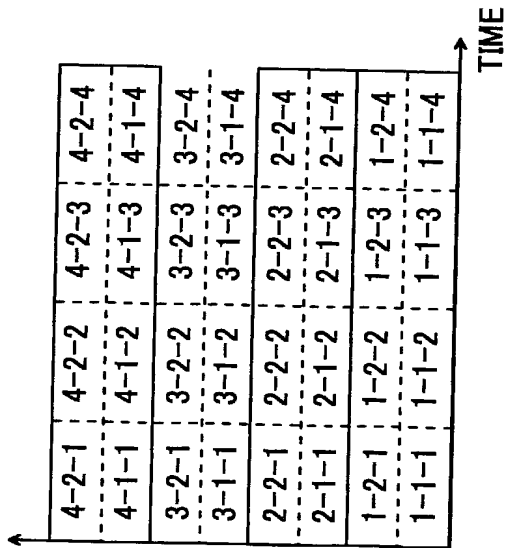


FIG. 28D

FIG. 28E

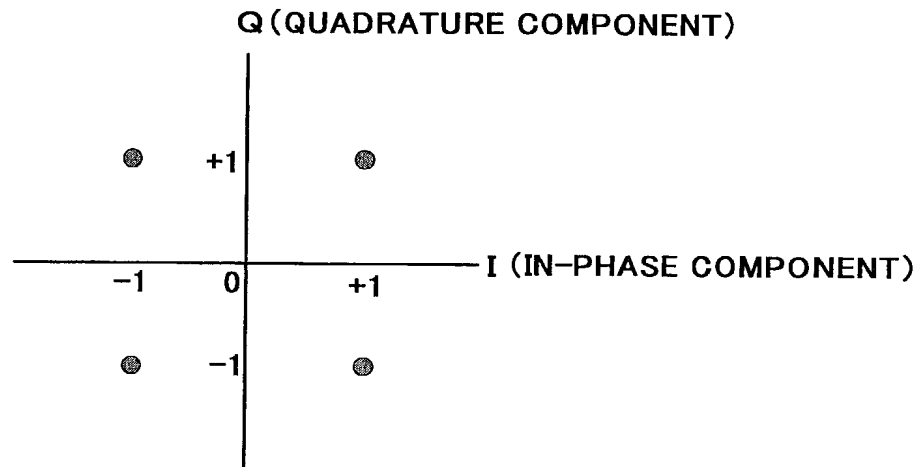
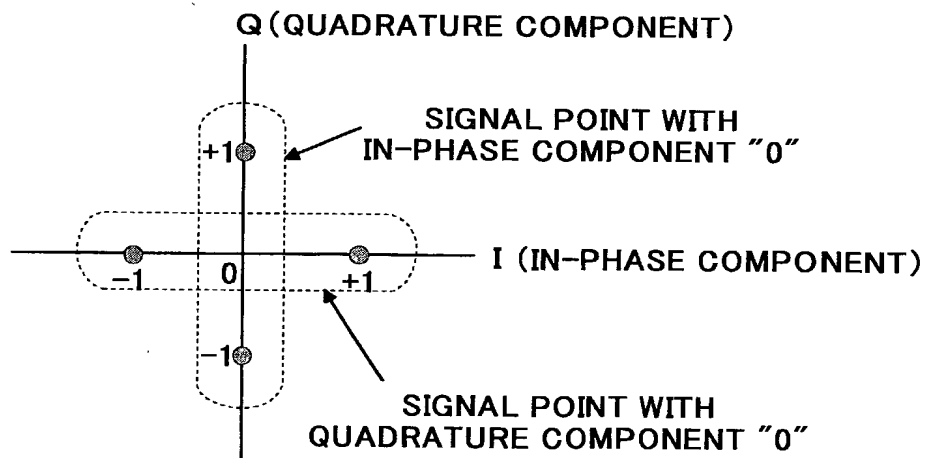


FIG.29A



**FIG.29B**

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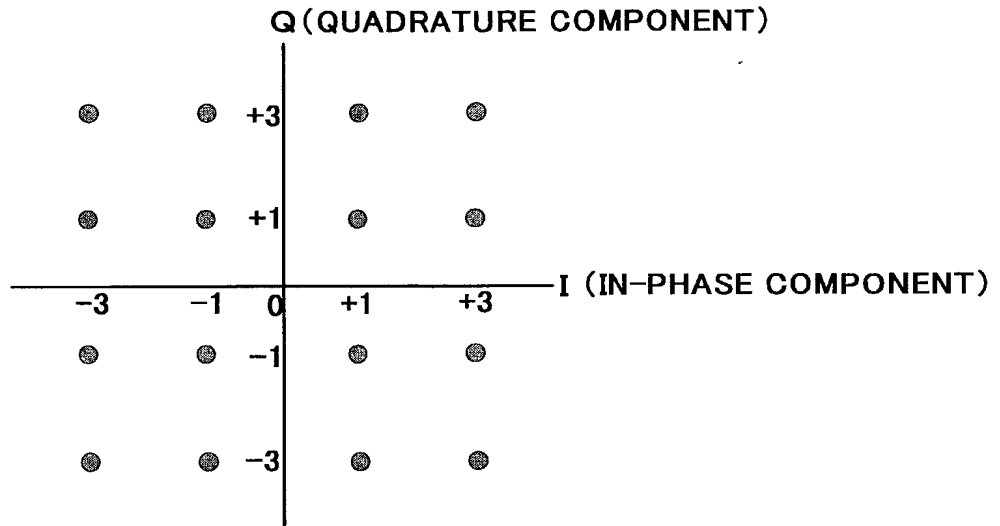


FIG.30A

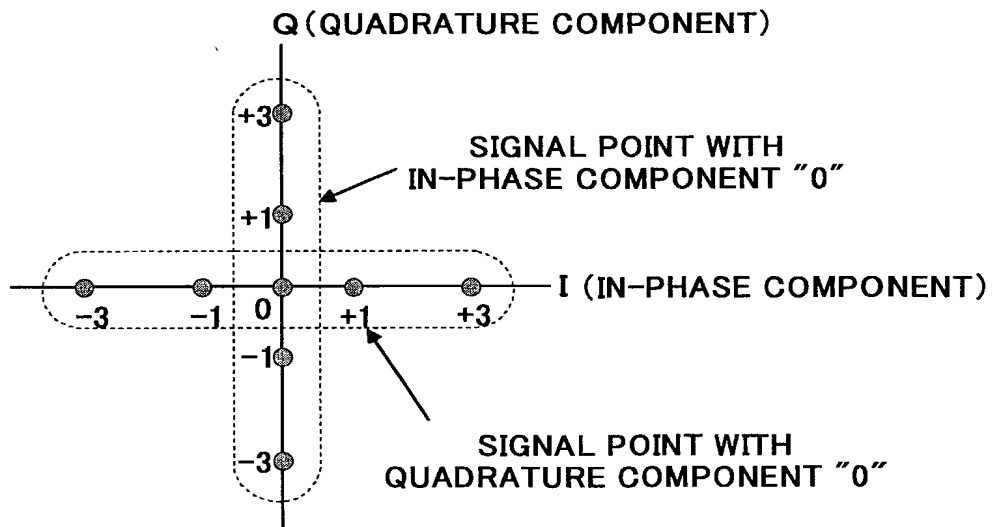


FIG.30B